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R E P O R T

OF THE

TWELFTH ROCKY MOUNTAIN CONFERENCE

OF ENTOMOLOGISTS

PINGREE PARK, COLORADO

AUGUST 18 to 23, 1935

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Report of the Twelfth Rocky Mountain Conference of Entomologists, Pingree Park, Colorado, August 18 to 23, inclusive, 1935

Edited by Geo. M. List, Secretary

A total of 92, the largest number to attend a Rocky Mountain Conference, gathered at the Colorado State College Forestry Lodge in Pingree Park, Colorado, for the week of August 18. Those in charge of the camp went to the Park on Saturday, August 17. Many of the visitors stayed in Fort Collins Saturday night and drove to the Park Sunday. Before night a good crowd was at the Lodge with everybody busy making their bunks and otherwise helping to get ready for the week. In all 15 states and the District of Columbia were represented.

The following is a list of those in attendance:

Bilstad, Nellie.....,Madison, Wisconsin
Bushnell, Mrs. R. J.....Madison, Wisconsin
Bushnell, Ralph J.....Madison, Wisconsin
Fluke, C. L.....Madison, Wisconsin
Fluke, Barnaby.....Madison, Wisconsin
Philip, Cornelius B.....Hamilton, Montana
Philip, Mrs. Cornelius B.....Hamilton, Montana
Philip, Bob.....Hamilton, Montana
Philip, Bonnie Dee.....Hamilton, Montana
Philip, Jo Joyce.....Hamilton, Montana
Philip, Gordon Wallace.....Hamilton, Montana
Parker, R. R.....Hamilton, Montana
Parker, Mrs. R.R.....Hamilton, Montana
Parker, Jane Louise.....Hamilton, Montana
Parker, Robert A.....Hamilton, Montana
Sanborn, C. E.....Stillwater, Okla.
Dean, Geo. A.....Manhattan, Kansas
Dean, Mrs. Minerva B.....Manhattan, Kansas
Dean, Dorothy.....Manhattan, Kansas
Cotton, Richard T.....Manhattan, Kansas
Cotton, Emily.....Manhattan, Kansas
Cotton, Robert.....Manhattan, Kansas
Kelly, Carol.....Manhattan, Kansas
Walkden, H. H.....Manhattan, Kansas
Walkden, Betty.....Manhattan, Kansas
Wilbur, Donald A.....Manhattan, Kansas
Parker, Mrs. R. L.....Manhattan, Kansas
Parker, R. L.....Manhattan, Kansas
Parker, Richard.....Manhattan, Kansas
McColloch, Mrs. J. W.....Manhattan, Kansas
McColloch, Marjorie.....Manhattan, Kansas
McColloch, Robert.....Manhattan, Kansas
Hayes, Louise G.....Urbana, Illinois
Hayes, John.....Urbana, Illinois
Hayes, Wm. P.....Urbana, Illinois
Farrar, M. D.....Urbana, Illinois
Farrar, Helen.....Urbana, Illinois
Farrar, Doris.....Urbana, Illinois

Farrar, Lloyd.....Urbana, Illinois
Shaftesbury, A. D.....Greensboro, N. C.
Swain, Ralph.....St. Louis, Mo.
Klots, Alexander B.....New York City
Ruckes, Herbert.....New York City
Stiles, W. W.....Rochester, N. Y.
Palmer, Miriam A.....Ft.Collins, Colo.
Daniels, Leslie B.....Ft.Collins,Colo.
Jones, Lena.....Ft.Collins, Colo.
Richmond, R.G.....Ft.Collins, Colo.
List, Geo. M.....Ft.Collins, Colo.
Hoerner, John L.....Ft.Collins, Colo.
Hoerner, Veda.....Ft.Collins, Colo.
Mickle, Gordon T.....Ft.Collins, Colo.
Mack, R. G.....Ft.Collins, Colo.
James, Maurice T.....Ft.Collins, Colo.
James,Mrs. M. T.....Ft.Collins, Colo.
Jones, C. R.....Ft.Collins, Colo.
Richmond, Mrs. R. G.....Ft.Collins, Colo.
Richmond, Ruth Jane.....Ft.Collins, Colo.
Richmond, George.....Ft.Collins, Colo.
Richmond, Jean Ann.....Ft.Collins, Colo.
Gillette, C. P.....Ft.Collins, Colo.
List, Mrs. Geo. M.....Ft.Collins, Colo.
Thompson, Alice A.....Ft.Collins, Colo.
Cosper, Margaret.....Ft.Collins, Colo.
Hills, Orin A.....Grand Junction, Colo.
Maxson, A. C.....Longmont, Colo.
Maxson, Gertrude.....Longmont, Colo.
Lee, Dorothy J.....Longmont, Colo.
Wade, Carrol W.....Paonia, Colo.
Newton, J. H.....Paonia, Colo.
Cockerell, T. D.A.....Boulder, Colo.
Cockerell, Mrs. T.D.A.....Boulder, Colo.
Bliss, E. R.....Greeley, Colo.
Bliss, Mrs. E. R.....Greeley, Colo.
Stiles, Geo. W.....Denver, Colo.
Stiles, Alice E.....Denver, Colo.
Blackman, Bessie.....Liberal, Mo.
Blackman, Rosebelle.....Liberal, Mo.
Troth, M. S.....Orleans, Ind.
Marshall, G. Edw.....Orleans, Ind.
Sorenson, E. J.....Logan, Utah
Stanford, J. S.....Logan, Utah
Henderson, W. M.....Logan, Utah
Knowlton, G. F.....Logan, Utah
Reeves, George I.....Salt Lake City, Utah
Wade, Otis.....Lincoln, Nebr.
Scott, John W.....Laramie, Wyo.
Scott, Mrs. John W.....Laramie, Wyo.
Scott, Margaret.....Laramie, Wyo.
Michener, Chas. D.....Pasadena, Calif.
Zaumeyer, W. J.....Washington, D.C.
Gillette, Esther.....Warm Springs, Ga.

In the absence of the Chairman, C. P. Gillette, the first meeting was called at 8 p.m. Sunday evening, by Vice-chairman C. L. Fluke. This consisted of a short business meeting, introduction of all present, followed by games and visiting. A letter from Dr. C. P. Gillette was read, extending greetings and expressing regret at not being able to be present during the entire week. He stated that on account of the altitude he thought it best not to spend more than a day or two at the meeting.

The following committees were appointed: Program - Geo. A. Dean, W. P. Hays and Cornelius B. Philip; Sports, to work with Mrs. M. T. James of the entertainment committee - Horseshoes, Herbert Ruckes; Golf, John "Bud" Hays; Resolutions, Alexander B. Klots, Mrs. Geo. A. Dean and Richard T. Cotton; Nominations - Geo. I. Reeves, Otis Wade and C. E. Sanborn.

Monday, August 19, 1:30 p.m. C. L. Fluke, presiding.

Recent Developments in Flour Mill Fumigation, R. T. Cotton, U. S. Bureau of Entomology and Plant Quarantine, Manhattan, Kansas.- During the past few years experimental work has been carried on with a method of applying liquid hydrocyanic acid directly into the milling machinery instead of into the open mill space. A series of pipe lines connects every piece of machinery with a manifold on the outside of the mill. Spray nozzles that open at a certain set pressure deliver uniform quantities of fumigant to each piece of equipment, and when the pressure is removed automatically close so that they cannot become clogged with milling stock between fumigations.

With the old open space method of fumigation it is necessary to dismantle the machinery in order to clean out the milling stock, since the low concentrations used will not penetrate very far into flour products. The labor cost of this operation, plus the cost of cleaning up the mill and reassembling the machinery after the fumigation amounts to as much or more than the cost of the fumigant used.

By applying the fumigant directly into the machinery concentrations high enough to penetrate the stock left in the milling equipment are obtained with a smaller quantity of gas, hence it is unnecessary to dismantle and clean out the machinery. The saving in time and labor makes it possible to fumigate at least twice as often at no greater cost.

The cost of installing such a system amounts to about 50 cents per barrel capacity of the mill.

R.T.C.

Cutworms, H. H. Walkden, U. S. Department of Agriculture, Bureau of Entomology and Plant Quarantine, Manhattan, Kansas.- Upwards of one hundred species of the cutworm type occur in Kansas and adjacent states. Of this number, about twenty-five species may be classed as common, and of these, there are ten or twelve of economic importance in this region.

The cutworms of the plains region fall into four groups, based on their ecological relationships; the semi-arid group, the southern group, the eastern or humid region group, and the transition group. Kansas is located in the transition zone, and the abundance of any of the above named groups is largely governed by climatic cycles.

In general, the northern species tend to be single brooded, while the southern and humid region groups are mostly multiple brooded.

Flight records of the adults of the various species are being taken at several points in Kansas and Nebraska, by means of trap-lights.

H. H. W.

Insects of Pasture Grasses, Donald A. Wilbur, Kansas State College, Manhattan, Kansas.- Semi-weekly collections of 25 sweeps each with the insect net, are being made on definite plots throughout the season. Insects are being reared from the dry grass. Many species found are of importance. The number and occurrence of the different species are being correlated with temperature. The high temperatures of 1934, when there were 65 days over 100 degrees, had a very direct effect upon the insect populations. A principal effect from grasshoppers in pastures is the cutting of heads and prevention of seeding. In 1934 there were many late hoppers in the pastures with strong evidence of a second brood of certain common species.

G.M.L.

White Grub Work at Wisconsin, C. L. Fluke, University of Wisconsin.- The experiment station at Madison has been carrying on this project since 1929. This past spring the Bureau of Entomology and Plant Quarantine established a grub laboratory at Madison, planning a thorough investigation of the life and control of these insects.

In order to make quantitative and qualitative measurements of grub populations, this past summer was given over to a critical rearing of known species, preserving all stages of each, hoping ultimately to be able to determine the species in any larval stage. It is planned also to discover if possible the survival of species under the various environmental conditions.

Some attention has also been given to practical control operations, consisting mostly of rejuvenation of ruined blue grass pastures, and of spray tests in the laboratory to determine the most effective beetle-killing agent.

Careful records were kept this summer of the flights of all species, their sequence of emergence, their preferred host plants, their reactions to temperature, wind, and slopes, and their egg laying capacities. Thirteen species were studied in detail and larval specimens of most of these are being reared.

C.L.F.

Kansas Insects for 1934 and '35, Geo. A. Dean, Kansas State College, Manhattan, Kansas. - The seasons of 1934 and '35 were extreme in many ways. Unfortunately drastic cuts in funds made effective studies impossible. In 1934 extreme heat killed many grasshoppers and chinch bugs, resulting in no serious outbreaks in 1935. Drouth caused much mortality from starvation. The most hoppers occurred in the sections of greatest rainfall.

The fall and spring canker worms were not affected by the high temperatures as they were in the soil during the heat period. The two spotted mite was the worst on record. Many elm trees were killed by them. The drouth favored all mites. Wood borers, especially the flat headed species, are attacking weakened trees. The Hessian fly was much reduced by drouth. Plant lice on tomatoes are very bad, their attack is being followed by mosaic diseases. The pea aphis population is very low.

G.M.L.

Codling Moth Work in Southern Indiana, G. Edw. Marshall, Orleans, Indiana. - One of the major problems has been the study of the attractiveness of certain of the electrically energized lights to the codling moth. We found last year that by placing one electrocutor light trap in each of several apple trees, not too close together in the orchard, we could attract as many as 250 codling moths in a single night. Further study showed that no matter how carefully the traps were placed in the trees for best position the difference in individual trees in the matter of attractiveness to the moths, was greater than the difference in the lights used. This year we have attempted to eliminate this variable and in doing so have mounted a wheel over the center of the tree. This wheel is over five feet in diameter and around its periphery we hang the lights we are testing.

This wheel is motivated by the use of a brush drag, a motor and a gear reduction unit so that the wheel rotates during the night one revolution every six minutes. In this way the chances of advantageous positions in the tree is eliminated. The rotation is started and stopped by an automatic time clock. We find that clear lamps are more attractive than those with frosted bulbs and that the greater the output of ultra violet, if the heat factor is eliminated, the greater the attraction of the light to the moths. Detailed information on this subject as it has been studied at Purdue may be gained from reference to a discussion of the subject in the September number of Agricultural Engineering, Vol. 16, No. 9, 1925.

The other major problem at the Southern Indiana laboratory is that of codling moth control which I am happy to state bids fair to success. We have found that increased dosages (35 or more gal. per tree per application, if trees are above 18 years of age) of oil-lead arsenate-soap combination, sprayed on beginning as soon after calyx as possible, and by shortening the interval between sprays with earlier discontinuation of spraying (from June 10 to July 10) we can positively drop the codling moth in its tracks, so to speak, with not too severe foliage injury and a residue load that can be satisfactorily reduced. From an infestation in 1933 of 93 to 125

worms per 100 apples we were able to reduce the 1934 infestation to less than 1.5 worms per 100 fruits. A careful study must be made of the amount of soap to add to the spray solution for best results in as much as it varies with the hardness of the water used.

G.E.M.

Codling Moth from a Grower's Standpoint, M. E. Troth, Orleans, Indiana. - On our way out from Indiana, Mr. Marshall and I visited rather thoroughly the larger apple producing sections enroute.

Throughout the Ohio, Mississippi, Missouri and Arkansas River valleys the weather conditions have been unusually favorable to the development of apple scab, but very unfavorable for the first brood of codling moth.

This is a season when too many growers who have had a serious codling moth problem during 1933 and '34 are in danger of getting too "cocky" about their first brood control. Because of very little damaging activity during all but the very last of first brood, many growers left off part of their sprays for first brood, as well as most of the second brood sprays. Bad cases of codling moth are not cleaned up this easily.

We have a few orchards in Indiana, and saw others in Illinois, Missouri and Kansas that right now, considering the season, have plenty of codling moth worries. The best time to crush an enemy is when he is down.

The accepted spray program for codling moth control in general, from 1926 (when we started fighting the worst infestation in Indiana) to 1930 was lead arsenate used in the calyx followed by lead arsenate with varying amounts of lime in from 2 to 3 first brood covers, 1 to 3 second brood covers, and 1 or 2 third brood covers; with the gallonage used per tree per spray left to the grower entirely. The reason for distributing the sprays throughout the season this way must have been that past experience in most moderately to heavy infested orchards under the use of lead and lime as then applied has shown that first brood usually does not take many apples, second brood may take a rather heavy toll, and often times third brood will take a very large share of the crop. For this reason many sprays were held to combat the later broods. In the main we followed this practice until this season.

In 1927 we started using careful orchard and packing house sanitation, as an aid to spraying and bands. This all helped the spray program very materially; but, there was something badly wrong with the spray program. We were being forced to fight our heaviest attack just prior to harvest. In 1930 we started using a small amount of summer oil in combination with lead arsenate, as a sticker for the lead arsenate. From the very start of the use of this combination we got a decided improvement in control for an equal number of sprays. We increased the amount of summer oil each year until in 1934 we used the lead-oil combination in each of 10 cover sprays, 8 of which carried oil sufficient to act as a very efficient ovicide. These sprays gave the trees a total of 7 1/2% summer oil for the season. The 1934 average control (following 1933 with calcium arsenate showing 91% actual larval entries at harvest) was as follows: 29% of the

fruit carried one or more stings, while only 4.31% let the larvae through alive. The 1934 lead load, however, was .320 to .500 and all but impossible to remove to tolerance witn a new tandem washer and the most severe treatment.

Our 1933 spray program was built almost entirely with the hope of controlling the first brood so thoroughly that little if any second brood spraying, and no third brood spraying would be necessary.

This program called for a calyx and 5 first brood sprays of lead and oil, at 5 to 7 day intervals, and applied with super thoroughness, starting immediately following an early calyx. All timing of the sprays was ignored except in determining the oil content for an ovicide. It also called for 1 or 2 second brood sprays to cover the peak of this brood. No third brood sprays were listed.

At the end of the 5th. cover there was so nearly no codling moth damage that we decided to bring up one of the second brood sprays to help cover a delayed first brood spurt as shown by trap catches and egg counts and end the 1935 spraying season there, on June 28.

No spraying has been done since June 28th. The day we left to come out here our total injury from both worms and stings was .078 of 1%; while unsprayed checks were running from 18 to 90% injured, and even lead checks were showing from 6 to as high as 35% injury.

Any spray program used against a heavy codling moth infestation is all but useless, UNLESS:

A - It is applied with super thoroughness, which means that every apple must be covered all over at each application as nearly as is humanly possible. Too many growers are apt to blame their lack of control on the recommended spray schedule, or on the materials they are using, when the principle cause of their lack of control may easily be due to failure on their part to see that a really thorough job was done.

B. - Plenty of gallonage is of prime importance. As a minimum not less than one gallon should be used for each tree, per year of age, per application. There will of necessity be a very noticeable drip.

C. - Spray Early. The first brood is the only cause of all later broods. Get the first. Under extreme infestations have the first 3 covers on before the first egg hatches, followed by 3 more at weekly to 10 day intervals.

D. - To date we have found nothing superior, everything considered, than the lead and oil combination. (The addition of some soaps possibly will increase this efficiency.)

Bad codling moth infestations can be controlled: By plenty of lead and summer oil, applied very thoroughly and early.

I have certainly enjoyed your meeting and all these new and old acquaintances up here in this fine wild secluded spot. And I want to thank Dr. List for his thoughtful and kind invitation to attend your meeting, and I would also like to thank "Doc" Jones for making it possible for Marshall and me to get in on the ground floor of this fine and worthy "kitchen police" work.

M.S.T.

Sodium Silicate as a Spray to Remove Residues on Apples, C. L. Fluke, E. P. Dunn and P. O. Ritcher, University of Wisconsin, Madison, Wisconsin. - Sodium silicate has certain values as a remover of arsenical spray residues; its value, however, appearing to be greater if used before picking time.

A highly alkaline sodium silicate was tested at Wisconsin and the results, briefly stated, are : First: The cold-dip method. In this method the sodium silicate was added to water without heating, at the rate of 1 1/4 pounds of silicate to 50 gallons of water. The fruit was dipped in this solution and immediately dipped in clear water. The apples were then allowed to dry. More than fifty percent of the lead and approximately fifty percent of the arsenic were removed in this manner. Under the regular 4 cover spray schedule this method will remove more than enough of the residue.

Second: The sodium silicate was used in the last cover spray, incorporating it with the lead arsenate, at the rate of 1 1/4 pounds to 50 gallons of spray. It acted as a good spreader and enabled the residue to weather more rapidly than where it was not used. This method is of particular value in "border line" states, that is, where the residues are only a little above the tolerance.

Third: The fruit was sprayed just before picking with sodium silicate, 1 1/4 pounds to 50 gallons of water, and followed immediately with a clear water spray. In one test the silicate was applied just before a heavy rain and the clear water spray was not necessary. This method was more effective when sodium silicate was incorporated in the last cover spray than where it was not used.

C.L.F.

Tuesday, August 20, 9 a.m. Geo. A. Dean presiding.

Transmission of Anaplosmosis anamarginale in Cattle by Horse Flys -- Tabanus, C. E. Sanborn, Oklahoma A & M College, Stillwater.- In an experiment begun in 1929 at the Oklahoma Agricultural Experiment Station conducted for the purpose of ascertaining the probable vectors of Anaplosmosis in Cattle, a project was set up to be conducted through the cooperation of the United States Bureau of Animal Industry and the local departments of Entomology and Veterinary medicine.

The personnel included in the investigation was: Dr. George W. Stiles of the United States Bureau of Animal Industry, C. E. Sanborn and Dr. Lewis H. Moe of the Experiment Station.

All local species of ticks obtainable were used in the beginning of the experiment. Horse flies were also used. But no affirmative results were obtained at first from ticks. Later, however, dermicenter vennustus -- the Rocky Mountain Spotted Fever Tick was proved to be a vector.

A total of eleven cases have been infected. Nine by tabanus and two by ticks.

The species of tabanus used were as follows:

Tabanus sulcifrons.
Tabanus equalis
Tabanus venustus
Tabanus abactor

C.E.S.

Insect Transmission of Equine Encephalomyelitis, George F. Knowlton, Agricultural Experiment Station, Logan, Utah. - The epidemiology of equine encephalomyelitis has long suggested the occurrence of an active insect vector. Kelser (1933) reported that the yellow fever mosquito, Aedes aegypti (L.), was capable of transmitting the disease from diseased to healthy guinea pigs and from diseased guinea pigs to a healthy horse. Merrill, Lacaillade, and TenBroeck readily transmitted this disease by the same Mosquito and found that the eastern saltmarsh mosquitoes Aedes sollicitans (Walker) and A. cantator (Coq.), were also capable of transmitting equine encephalomyelitis. In cooperative work between the Departments of Animal Pathology and Entomology conducted at the Utah Agricultural Experiment Station, it was found that two species of native Utah mosquitoes, Aedes nigromaculis (Ldw.) and A. dorsalis (Mg.), were capable of transmitting the western strain of equine encephalomyelitis from diseased to healthy guinea pigs. Horses, subsequently inoculated with equine encephalomyelitis brain emulsion from guinea pigs of the A. nigromaculis transmission strain, contracted typical cases of equine encephalomyelitis.

G.F.K.

The Transmission of Infectious Anemia or Swamp Fever of Horses by Insects, John W. Scott, University of Wyoming, Laramie.- Infectious anemia in horses is an obscure, insidious disease due to a filterable virus found in the blood. The disease may be acute, resulting in death within two to six weeks; chronic in various degrees, resulting in death or apparent recovery after several weeks or months; and latent, in which no symptoms appear and demonstrable only by sub-inoculation of blood. Apparently healthy horses may carry the virus for years.

A number of years ago we worked on the transmission of this disease by means of insects. The first year sick and well horses here were stabled side by side in a small-meshed screen cage into which was introduced large numbers of Stomoxis calcitrans. A clear case of the disease developed in one of two well horses. The second year two screened cages were built, one for sick horses the other for horses without the disease. Transmission was obtained:

(1) By exposing Stomoxis calcitrans in small wire cages on backs of sick horses, and then interrupting their feeding they were carried into the other screen cage and exposed to the backs of well horses.

(2) Transmissions were obtained in a similar manner by using Tabanus septentrionalis. That the transmission in both instances was mechanical was shown by an experiment in which the pricks of an hypodermic needle were substituted for the biting flies.

(3) Other experiments demonstrated the presence of the virus in the nasal secretions, thus suggesting the possibility of transmitting the disease by means of non-biting flies.

Dr. F. S. Jones, of the Rockefeller Institute for Medical Research, while working in Wyoming, proved that the disease was not due to spirochaetes as explained by Japanese workers. Dr. Jones found a small sigmoid organism in cultures from the blood, but failed to establish a definite causal relation to infectious anemia. Fulton has shown that the organism may be found in water where abundant plant growth is undergoing decay.

J.W.S.

The Rocky Mountain Spotted Fever, R. R. Parker, Public Health Service, Rocky Mountain Laboratory, Hamilton, Montana. - The entire aspect of the problem of Rocky Mountain spotted fever has been changed markedly since the first research by Wilson and Chowning in western Montana in 1902. The problem is no longer one of merely local interest, but is of importance to the whole country. The Rocky Mountain Laboratory of the United States Public Health Service at Hamilton, Montana, where spotted fever investigations are now being carried on, represents an investment of a quarter million dollars and has a staff of forty-five.

Two ticks, Dermacentor andersoni and D. variabilis, are now known to be involved in transmission to man. The ranges of these two ticks extend over practically the entire United States. Three other species, Rhipicephalus sanguineus, Amblyomma americanum, and D. occidentalis, are recognized as potential transmitting agents. They transmit the disease readily under laboratory conditions and their host relationships are such that it is apparently possible for them to act as vectors in nature. Actual transmission in nature or to man has not yet been shown, however. Two tick species, Haemaphysalis leporis-palustris and D. parumapertus, transmit spotted fever in nature.

The occurrence of Rocky Mountain spotted fever east of the Rocky Mountain region was first demonstrated conclusively by officers of the Public Health Service in 1931 and since that time has been found to be epidemic in 22 of the 35 states comprising the eastern and central parts of the country. The question whether spotted fever has spread from the west to the east is still unanswered, but it is now recognized that infection was present in states close to the Atlantic as long as twenty-five years ago. It is entirely possible that the infection has been present in the East for many years and not been recognized.

The most important result of the spotted fever research work which has been carried on by the Public Health Service has been the production of a preventive vaccine. This vaccine has now been in use for ten years, and the results of its use during this period, as recently summarized, show that the vaccine ordinarily confers full protection against the less severe types of spotted fever infection and that against the highly fatal types full protection is less frequent, but that the average person is sufficiently protected to insure a marked amelioration of the course of infection, recovery and a shorter period of convalescence. It also appears probable that a considerable portion of persons carry over some degree of immunity into the second year. However, since there is no means of distinguishing between those individuals which do and do not carry over protection, it is necessary to recommend vaccination of exposed individuals each year as has been done in the past.

One of the phases of the work at the Rocky Mountain Laboratory concerns the relation of Rocky Mountain spotted fever to other typhus-like diseases, particularly those of the tick-borne group which, in addition to spotted fever, includes Sao Paulo exanthematic typhus of Brazil, boutonneuse fever of southern Europe and Northern Africa, South African tick-bite fever, Indian tick typhus and West African tick typhus. In the case of Sao Paulo typhus, it appears probable that this infection is either identical, or so nearly identical, with spotted fever that there is for all practical purposes no essential difference. There is perfect cross-immunity between these diseases, and vaccine prepared against the one affords equally good protection against the other. On the other hand, though spotted fever and boutonneuse fever also show perfect cross-immunity, spotted fever vaccine does not protect against boutonneuse fever. West African tick typhus is probably the same as boutonneuse fever. South African tick-bite fever is probably distinct from other diseases of the tickborne group, but very little opportunity to make comparative tests with the virus of this disease has been offered. The nature of Indian tick typhus is quite uncertain, but clinically the disease is very similar to spotted fever.

One of the most important results of recent studies made at Hamilton has been the finding of plague in southwestern Montana during the summer of this year. The ground squirrel population has been affected from the Idaho line east to the Madison River Valley, involving the southern portions of Beaverhead and Madison counties, The total area represented is greater than the combined area of the states of Connecticut and Rhode Island. Since the region concerned is considerably east of any prior known occurrence of plague, and since the infection has apparently reached Montana by some route of travel along the course of which its presence has not been recognized, it is evident that the potentialities of the spread of plague into the Rocky Mountain region are unknown. It appears possible that eventually this dreaded disease may become a real problem to a considerably greater number of states than those now known to be affected.

R.R.P.

Tuesday, August 20, 2 p.m. John W. Scott presiding.

Rocky Mountain Spotted Fever (Eastern type), A. D. Shaftsbury, Greensboro, North Carolina. - The Rocky Mountain spotted fever was reported in North Carolina in 1930. It probably existed there earlier. In 1933 thirty-seven cases of which 27 were severe, were reported. The case histories of several of these are being studied. The mortality has been 16%. A tick survey of the state is being made.

G.M.L.

Tularaemia with Special Reference to Artnropod Vectors, C. B. Philip, U. S. Public Health Service, Hamilton, Montana. - One of human diseases with a most spectacular rise to national and even international concern from obscure beginning. Cause, Bacterium tularense, discovered by McCoy in 1911 as "plague-like disease of ground squirrels" in Tulare County, Calif., hence the name. Discovered more or less independently in several parts of the country - "deer fly fever" in Utah, "glandular type of tick fever" in Southern Idaho, "rabbit fever" in Ohio and middle western states, "market or rabbit disease" among meat handlers in Washington, D. C., and "conjunctivites" in certain Southwestern states; also as "O'Hara's Disease" in Japan.

Infection severe but of low mortality (5%) among mankind. Usual cases develop slow-healing ulcer at portal of entry (abrasion, insect or tick bite) and involvement of glands draining the area. Diagnosis after about 2 weeks also aided by very sensitive serological tests. Cases due to tick bite usually occur in the spring while those following fly bite occur later in the season. Treatment is chiefly symptomatic, the value of a recently developed anti-serum being still in the formative stage.

Role of tularaemia in cycles and rhythms of natural small animal populations especially rabbits, is probably operative, at least as one factor in the environmental resistance. Epizootics of greater or less extent have been reported in jack and cottontail rabbits, meadow mice, certain game birds, domestic sheep in the U.S. and in water voles of Scandinavian countries and U.S.S.R. of Europe. Variations in virulence of the organisms and possibly in susceptibility of hosts, or their health and vigor or superposed parasitism, may be factors.

Methods of infection include ingestion, or thropod transmission including fecal or crusted tissue contamination, and direct contact including the eyes and penetration of the unbroken skin. Animal and arthropod hosts show wide zoological distribution and their number is increasing yearly both experimentally and natural. Possibly no human disease shows a wider adaptation in its avenues of potential infection and a chart showing such avenues is extremely complex.

Positive transmission experiments include practically all biting insects and ticks tried, including fleas, bed-bugs, biting lice, several species of horse-flies and deer-flies of which Chupops discalis is the classic example, black flies, stable flies, mites of mice at least and possibly biting midges. The longest delayed interrupted transmission in our experiments was 30 hours with Tabanus

rupestris while survival of Bact. tularense in C. pertinax for 44 days was demonstrated. Fecal droplets of the 26th. day were infective. The role of the flies appeared purely mechanical although passage through the eggs of ticks has been shown. The organisms penetrate the tissues of arthropod vectors where multiplication occurs. The method of tularaemia transmission by arthropods therefore would classify under Huff's system as propagative mechanically.

C.B.P.

Methods of Modern Taxonomy, M. T. James, Colo. State College, Ft. Collins, Colorado. - Systematic entomology has undergone several stages of development. First came the pioneer stage, in which such prominent men as Linnaeus, Fabricius, and Say, with a virgin field before them, could describe as new almost anything they found. These men, moreover, covered a large part of the animal kingdom, and were sometimes botanists as well. There followed a stage of intensive systematic work, characterized, however, by a restriction in the scope of the field of workers. The third stage is one of monographs and generic revisions; this, in turn, leads to the ideal of taxonomic work, namely, the stage of refinements of systems and of development of phylogenies.

Modern systematic research is, for the most part, in the third and fourth stages today. The need of systematic work is to develop comprehensive treatments of taxonomic groups and of faunas, and to build up natural classifications based on phylogenetic studies. Such studies should take into consideration the totality of characters, rather than just certain characters which are believed to be primarily important. Furthermore, taxonomic research must be pursued with two aims in view: it should, on the one hand, be considered as an end in itself, as a field of pure research; and in the second place, it should be considered as auxiliary to the work of the economic entomologist. It is chiefly from the latter viewpoint that faunistic treatments, state lists, etc., are demanded.

M.T.J.

On Modern Taxonomy, Alexander B. Klots, College of the City of New York, New York City. - The modern physicist has entirely rebuilt our concept of the behavior and structure of matter, using his new knowledge of the dynamic nature of the atom and of its component parts. Similarly the modern taxonomist must recognize the dynamic nature of speciation. Our knowledge of the biological principles underlying the differentiation of species and of larger categories is steadily increasing, due to the enormous amount of experimental work being done in those fields of Biology that deal directly with the living organism. The taxonomist must keep abreast of the times in such phases of research, and must be able to apply new discoveries in these fields to his own work. No longer can he be a recluse, concerned only with naming and cataloging. True, the formulation of a stable nomenclature for the use of other biologists is the primary service which the taxonomist must render. But beyond this he enters into that part of his domain which should be concerned with the formulation of a truly "natural" system of classification, based on an understanding of the dynamic nature of his subject, not merely on a study of phenotypic morphological characters.

A.B.K.

The Present Status of the Classification of Immature Insects, Wm. P. Hays, University of Illinois, Urbana, Ill. - The present day knowledge of immature insects is incomplete and fragmentary as compared to the information that is available concerning adult insects. The study of immature insects has been neglected, but is of great biological interest because a knowledge of the preparatory stages of insects is essential to an understanding of the many adaptations of insects, whose significance can only be recognized when light is thrown on the immature stages. Comparative studies of immature forms will yield light on the significance of metamorphosis, especially as to the origin and development of this phenomenon which appears in its greatest development in the specialized insects. Certain adaptations of immature insects when fully understood should aid in the application of the biogenetic law to insects and all attempts to correlate insect ontogeny with phylogeny must give careful consideration to the characteristics and peculiarities of postembryonic development. It seems hardly necessary to stress the importance of the study of immature insects. They afford numerous aids in the study of phylogeny and classification when study of the adults fails to furnish the necessary evidence. Moreover, larvae are of great interest because of their habits which furnish abundant material for the study of insect ecology, a much neglected field.

Not only have the structural and functional modifications of immature insects been neglected but the taxonomic aspect is in a deplorable state and there is at present a crying need among the economic investigators for a way out of the present chaos. There is scarcely an economic entomologist but what has dire need for a system of classification of immature insects. To be sure, some work has been accomplished but what little has been done is scattered widely in the ever increasing flood of entomological literature. No attempt has ever been made to bring together the known facts of larval and nymphal development and not even a bibliography on the whole subject is available.

The discussion was an attempt to bring together some of the materials for the classification of immature insects; the important facts of metamorphosis and some structural characteristics were considered, and some available keys to the immature stages of insects were noted in the hope that others will strive for a further advancement in the classification of immature insects.

W.P.H.

Wing Venation in the Brachycerous Diptera, C. B. Philip, U. S. Public Health Service, Hamilton, Montana. - The Comstock-Needham, Shannon-Bromley, and Alexander-Tillyard systems of nomenclature for the lower families of Diptera were reviewed and certain apparent discrepancies in our experience with Tabanidae pointed out. Suggested revisions in the designation of radial sector, media, and cubitus as a result of possible relocation of the sectoral, medial, and mediocubital cross-veins, were based on the following 3 postulates: (1) That cross-veins in lower Diptera tend to maintain vertical positions, and to shorten at the expense of or with consequent distortion of the primary, longitudinal elements, or to disappear with coalescence of these elements, (2) That such local areas in species showing isolated clouds, are dynamic or "points of stress" about which infuscation tends to concentrate, although it may run out along

the "distorted" portions of the adjacent primary veins, e.g. Tabanus lasiophthalmus, and T. mexicanus, and (3) That aberrant spurs and veins, infrequently as they occur, represent significant "throw-backs" or atavistic tendencies which may indicate the direction in which vein reduction has proceeded. Under this conception the principle longitudinal veins in the wing of Tabanus would be indicated in the following sequence; Costa, Sub-costa, $Radius_1$, R_2, R_3, R_{4+5}, $Media_{1+2}$, M_3, M_4, $Cubitus_1$, Cu_2, and 1st, 2nd., and 3rd. Anals. The sectoral ("s") cross-vein would connect base of R_1 with R_{4+5}, the medial ("m") would connect M_{1+2} and M_3 and the medio-cubital ("m-cu") M_4 and Cu_1.

C.B.P.

Tuesday, August 20, 8 p.m. C. L. Fluke presiding.

North American Ticks, R. R. Parker, U. S. Public Health Service, Hamilton, Montana. - This was a lantern talk on the ticks of North America and their relation to the Rocky Mountain spotted fever. Slides of the laboratory and equipment of the Public Health Laboratory, Hamilton, were also shown.

Wednesday, August 21, 8 p.m., W. P. Hays, presiding.

Wild Bees, T.D.A.Cockerell, University of Colorado, Boulder.- Slides and movies showing nesting and other habits of a number of species of wild bees were shown.

Thursday, August 22, 9:30 a.m. C. E. Sanborn presiding.

Resume of the Sugar-beet Leafhopper Work of the Bureau of Entomology and Plant Quarantine, Orin A. Hills, Grand Junction, Colo.- Curly-top of sugar beets, a major disease of this plant, is transmitted only by the leafhopper, Eutettix tenellus Bak. The insect breeds outside the cultivated area and during certain seasons of the year moves into the cultivated area.

Curly-top also occurs on plants other than sugar beets. Curly-top on tomatoes sometimes is rather severe. Tomatoes apparently present no varietal resistance.

Curly-top in beans is also sometimes of considerable importance. Unlike tomatoes certain varieties of beans are highly susceptible to curly-top, while other varieties are resistant.

Extensive investigations of the beet leaf-hopper, Eutettix tenellus Bak., were undertaken in 1925, by the Bureau of Entomology and Plant Quarantine. The first laboratory was established at Toppenish, Washington. This laboratory was later moved to Twin Falls, Idaho and since that time the problem has been studied by the Bureau of Entomology and Plant Quarantine in practically all the western states.

Since certain conditions vary the severity of the curly-top disease from year to year, the early work consisted almost entirely of gathering data which would enable the workers to predict in advance of planting date the severity of the disease, for the coming season. The first essential of this prediction was a survey to determine the location of the breeding grounds. After the breeding grounds had been located, it was necessary to conduct ecological studies on the breeding grounds to determine what factors limited the production of high leaf-hopper populations.

The ecological studies revealed that Russian thistle in all known cases, is necessary to the production of high populations of this insect and occurs primarily on abandoned and overgrazed land. For this reason, during the season of 1934 the Bureau of Entomology and Plant Quarantine in cooperation with the Bureau of Plant Industry outlined a possible program for the control of the leaf-hopper in the inter-mountain region by proper land utilization which is primarily the prevention of over-grazing on range lands.

In some areas attempts have been made to control the insect by spraying of the wild host plants in the fall of the year with a pyrethrum oil spray. This reduces the population for the coming spring. A direct control program by spraying in the beet field with pyrethrum oil spray as well as experiments with trap crops in the beet fields are now being carried out at the Grand Junction laboratory.

O.A.H.

The Relation of Aphids to the Spread of Bean Mosaic, Wm. J. Zaumeyer, U. S. Bureau of Plant Industry, Greeley, Colo. - Studies on the relation of aphids to the spread of bean mosaic on beans show that although aphids are not as numerous on beans as other species of insects they are responsible for the dissemination of mosaic under field conditions. The aphids involved in these studies with the exception of Aphis rumicis L. are not ordinarily found in large numbers on beans but are merely transitory in their movements between more favorable hosts. It is therefore probable that the relative percentage of the different species found on beans depends to a large extent on the crops where plants grow in close proximity to bean fields. In Virginia and Colorado where these investigations were conducted, the aphids were more abundant on beans about ten days after the beans are above ground. As the season progressed the aphid populations decreased.

Fourteen species of aphids were found on beans in the field and it is likely that a more intensive and extensive search may reveal others. Positive transmission of the bean mosaic virus was proved for eleven species of aphids as follows: Aphis gossypii Glov., Aphis medicaginia Koch., Aphis rumicis L., Aphis spiraecola, Brevicoryne brassicae L., Hyalopterus atriplicis L., Rhopalosiphum pseudobrassicae Davis., Macrosiphum ambrosiae Thos., Macrosiphum solanifolii Ashm ., Illinoia pisi Kalt., Mysus persicae Sulz. The aphid Neothomasia populicola Thos, did not transmit the virus in the experiments. Two species of aphids were not tested since the numbers in which they were found would not permit testing for transmission of the disease.

It would appear that the spread of the bean mosaic in the field is dependent upon the prevalence of aphids as well as on the amount of primary infection appearing early in the season.

Psyllid Yellows of Potatoes and Tomatoes, Geo. M. List, Colo. Experiment Station, Fort Collins, Colo. - The condition of potatoes and tomatoes known as psyllid yellows which may at times cause entire crop failures is caused by the feeding of the tomato psyllid Paratrioza cockerelli Sulc. It is thought to be more of a toxic effect than a true virus disease. Excellent control is being secured thru the use of lime sulfur spray. The control is being generally adopted. This year probably from 50 to 65 percent of the potatoes of the state are being sprayed. The lime sulfur is rather severe on tomatoes so a number of other materials are being tried. Sulfur dust and wettable sulfur show promise and are less severe on the plants. Sulfur in different forms has a definite lethal effect upon the nymphs and a repellant effect upon adults.

G.M.L.

The Peach Mosaic, Geo. M. List, Colorado Experiment Station, Fort Collins. - The peach mosaic was definitely identified in the Palisade section of Mesa County, Colorado, last season by Mr. E. W. Bodine of the Botany Section of the Experiment Station. This identification was later verified by Dr. Lee M. Hutchins of the U. S. Bureau of Plant Industry, Fort Valley, Ga. A vigorous eradication program is under way through the cooperation of the Office of State Entomologist and the Botany Section of the Experiment Station. A WPA project has been approved and is just now being put into operation All trees in Mesa County are now being given the 3rd. careful examination. From 5 to 16 scouts have been at work since the leaves appeared in the spring. In the neighborhood of 28,000 diseased trees have been removed and burned. The scouting will include all peaches of the state.

This very infectious new disease is characterized by a very typical mottling, crinkling and narrowing of the leaves, a shortening of the internodes and roughening of the fruit. The fruit is delayed in maturing "punky" in texture and unfit for human consumption. A diseased tree has never been known to recover.

Indications are that there are insect vectors. An attempt is being made to determine this definitely. A study is being made of the insect fauna of peach in that section and 14 species that may be capable of spreading the virus are being tested as possible vectors.

G.M.L.

Economic Investigations of the Illinois Natural History Survey, M. D. Farrar, Urbana, Illinois. - Abstract of Major Fields of Investigation by Survey Staff.

Field Crop: Corn root worm, the effect of rotation on abundance and damage; Hessian fly, emergence and seeding dates as affecting yield; Sunflower weevil, effect on seed production; Chinch bug, more efficient barriers (paper) and resistant strains of corn adaptable to corn areas; Corn borer, resistant adaptable strains of corn.

Fruit Insects: San Jose scale, miscible oils; Codling moth, arsenical substitutes and cold dipped bands; Oriental fruit moth, oil dusts.

Small Fruits: Red spider, summer oils; Strawberry thrips, their effect on pollination.

Stored Products: Stored grain insects, new gases.

Greenhouse: Mexican mealy bug, 1/4 oz. H C. N - 30 minute exposure; Mushroom mites, sanitation.

Shade Trees and Shrubs: European elm scale, dormant oils; Oyster shell scale, summer oils; Flat headed borers, types of wrappings.

Truck Crops: Leaf feeders, control -rotenone and pyrethrum dusts.

Animals: Fleas, crude naphthalene and miscible oils; Horse Bots, area clean up; Poultry lice, nicotine sulphate.

Household: Cockroaches, 1-1 sodium fluoride, sodium silico fluoride; Clothes moths, sodium fluoride; Ants, new baits.

New Insecticides: (under investigation)
Oil soluble nicotine, copper cyanide, new summer oils.

Insect Abundance Forecasts (on major crops)
Corn, small grains, legumes, fruits, and truck crops.

M.D.F.

Thursday, August 22, 2 p.m. C. P. Gillette presiding.

Fly Control on the A. and M. Farms, Stillwater, Oklahoma, F. A. Fenton, Stillwater, Oklahoma. - (Paper read by C. E. Sanborn) The fly control campaign was conducted on a five-point program as follows:

(1) Proper disposal of breeding media.
(2) Chemical treatment of breeding media.
(3) Trapping adult flies.
(4) Spraying to kill adult flies.
(5) Poisoning adult flies.

Recommendations for the disposal of breeding places consisted of (1) hauling manure away and spreading on the fields daily, (2) keeping manure in screened pit, (3) burning refuse in an incinerator. Pasturing animals, or any way to get them out of the barns and corrals also greatly helped. This was the most important part of the program.

Wherever it was impossible to haul away or burn breeding media, it was treated with borax. Hellebore was found to be unreliable for this both by laboratory and field tests. This chemical treatment was also a very important factor in reducing the fly population.

Large cylindrical traps, built according to government specifications were used. The number installed per barn depended upon the size and seriousness of the fly situation there. An average of two per barn was found satisfactory. These were baited with a mixture known to be especially favorable for breeding house flies. The formula is:

wheat bran.....3 1/4 lbs.
alfalfa meal.....1 3/4 lbs.
yeast.....2 cakes
water.....5 qts.
Diamalt.....25 cc.
Black strap molasses 1 qt.
Additional water to keep moist.

The traps were baited three times a week and water added daily. Bait was no longer attractive when dry. During the peak of the fly season as many as 40 flies entered the trap a minute. Over fifty percent of the flies captured were females, and 95 percent were Musca domestica. Fly traps were very important in helping reduce the fly population. Over 6 million flies, by quantitative estimate have been taken to date in these traps.

Spraying the barns with a strong pyrethrum spray was also effective. The spray used was ome developed especially by the department and manufactured in its laboratory.

Poisoning adult flies, especially where it was impossible to place the traps, aided greatly in the campaign. The formula used was as follows:

milk and water in equal proportion.....1 pt.
molasses sufficient to sweeten (4 oz. per gal.)
concentrated formaldehyde (40%).....2 or 3 teaspoons.

The poison was put out in tin pie pans.

The results as of August 26 have been very satisfactory. The fly population has reached a very low ebb so that it is now possible to count the flies in the traps rather than measure them by volume. Traps are visited twice a week now instead of three times a week. Reports from house owners, tenants, and the different barn superintendents all agree in that the campaign has been a complete success. Requests have been received to continue the work.

F.A.F.

Codling Moth Studies, J. H. Newton, Office of State Entomologist, Paonia, Colo.- An account was given of plans for the season's experiments. Two new arsenical compounds and two non-arsenical compounds are being tried. The most emphases is being given to spreaders, stickers and defloculators that will aid in giving a heavier and more uniform load of arsenate of lead. Chemical prints on sensitized paper were exhibited showing, in a comparative way, the amounts of arsenate of lead on leaves and different parts of the fruit surface, with the different combinations used.

Alfalfa Weevil Investigation, Geo. I. Reeves, U. S. Bureau of Entomology and Plant Quarantine, Salt Lake City, Utah. - The alfalfa weevil investigation began in 1910, with practical field experiments in cultural control to apply the principles of life history and habits which had been discovered by the entomologists of the Utah Experiment Station. It continued with the introduction of European parasites, including Bathyplectes curculionis, and began, in 1913, what I believe to be the first quantitative population study attempted in this country.

The results of this study were applied during the investigation of spraying, dusting, pasturing and other control methods, of which spraying and dusting were developed to a practical degree and were widely adopted.

During the years 1913 to 1915 the occurrence of weevils in alfalfa hay, agricultural products generally and in commercial traffic, was intensively studied and the dangerous channels of dissemination were determined.

Later this subject was again taken up, with special attention to the occurrence of alfalfa weevils in hay shipments, in alfalfa meal and about meal mills, and it was found that weevils occur in hay in numbers so small as to be negligible, but yet sufficient to prevent the hay from being certified as "Weevil Free." Mill premises were found to be infested to the same extent as any other premises in the weevil-infested territory. Alfalfa meal produced by well-built grinders of the hammer type, and by grinders of the chopper type when supplemented by the proper sort of fan, was found to be as clean as any other commodity passing through the infested territory. Freight cars which had been used for handling hay in the infested territory were frequently found to contain live weevils and were scattered over the entire United States.

After this subject was disposed of, the study of weevil populations as a means of getting the facts necessary for practical control of the pest was resumed under greatly improved conditions and it has led to the discovery of suitable control measures in the two localities, namely, Salt Lake City, Utah, and Medford, Oregon, where a sufficient body of data has been gathered. The control method suitable for Salt Lake consists in the regulation of the cutting-time of the hay crop; that indicated for Medford, Oregon, lies in clipping the early growth to destroy the eggs and small larvae contained therein, and this treatment at the same time retards the first hay crop so as to bring its harvesting within the dry season. Neither of these methods has been sufficiently tested in practical experiments to warrant its recommendation to farmers and county agents.

A beginning has been made toward extending the population study method to western Nevada, central Utah, eastern Idaho and western Colorado, but several years more of data will be necessary before the normal course of weevil development with reference to the climate and the crop methods in those places can be considered established.

G.I.R.

Groups of Aphids as Related to Groups of Plants, Miriam A. Palmer, Agricultural Experiment Station, Ft. Collins, Colo. - The tribes of aphids were illustrated showing structural characters and were charted giving number of genera under each infesting the various families of plants. Certain families of plants are infested only by certain tribes of aphids. Root infesting aphids are found in almost all the tribes. The three following tribes, namely APHINI, ERIOSOMATINI and PEMPHIINI, contain almost all the aphids infesting economic plants, and acting as vectors of plant diseases affecting fruit and crop plants.

The Artemisias, excepting Artemisia dracunculoides and related glabrous species, are inhabited only by aphids possessing a needle-like tip to the beak. These aphids belong to the tribe APHINI but to 5 or more genera. This beak is unknown, to the writer, in aphids infesting any other kind of plant except one species on Chrysanthemum which has also been taken on Artemisia.

M.A.P.

Thursday, August 22, 7:30 p.m. M. T. James presiding.

Miss Esther Gillette gave a talk on her work at Warm Springs, Georgia, with the handicapped with infantile paralysis.

Mrs. T. D. A. Cockerell showed moving pictures of Signa Carlsen of Greeley - handicapped for 20 years but doing remarkable work in weaving.

Prof. and Mrs. Cockerell then entertained with movies "Gray Owl and His Beavers" and readings from "Pilgrims of the Wild."

At a short business session Thursday afternoon the following report of the resolutions committee was made and adopted.

Be it resolved that: -

1. The Twelfth Annual Rocky Mountain Conference of Entomologists wishes to express its appreciation to the Colorado State Board of Agriculture and the Department of Forestry for placing at its facility the buildings, grounds and equipment of the College of Forestry Lodge at Pingree Park, which are so admirably fitted for the requirements of this conference.

2. We further tender our heartiest thanks to the members of the Department of Entomology of the Colorado State Agricultural College and especially to Doctors List & Jones, Messrs, Richmond, Daniels, Newton and Mrs. Jones, Miss Palmer and Mrs. James for arranging the details of this conference, and for their hospitality which resulted in making this meeting both profitable and enjoyable; and to the kitchen staff for their excellent cuisine.

3. Where as ill health has prevented the inspiring presence of Dr. C. P. Gillette at this Conference for the entire time, be it resolved that an expression of our regret be tendered to Dr. Gillette with hopes that improved health will permit him to be with us next year.

4. Since the presence of the delegation from the U. S. Public Health Service from Hamilton, Montana, has added greatly to the interest and scientific value of the programs be it resolved that the appreciation of the conference be expressed to them.

5. The Conference expresses the appreciation of the presence of Dr. & Mrs. Cockerell and its thanks for their contributions to the program.

Be it further resolved that:

1. A recommendation be made for the installation of a fly trap at the kitchen door, thus relieving Miss Palmer of much strenuous labor.

2. That the thanks of the Conference be extended to those hardy disciples of Isaac Walton who at an average cost of 66 1/2¢ per trout have so nobly brought home the scaly bacon.

3. That thanks of the Conference be sent to the nearest weather Bureau Station for supplying an unusual brand of weather even for Colorado.

4. That in future years a uniform set of rules be set up in advance for mountain golf, contract, bridge, knitting, Sink the Navy and the duties of K.P.

Be it further resolved that: a copy of these resolutions be transmitted to the Secretary of the Conference for inclusion in the minutes of the Conference.

Respectfully submitted

Alexander B. Klots
Minerva B. Dean
Richard T. Cotton

The following officers were elected for 1936: C. P. Gillette, Chairman; Donald A. Wilbur, Vice-Chairman; Geo. M. List Secretary; C. R. Jones, Treasurer.

From the Collecting Net

A good growth of vegetation in the Park, excellent weather, and several enthusiastic collectors were responsible for many insects being taken in the collecting nets this year. Tabanids, syrphids and bees were especially in demand.

Dr. A. B. Klots and Dr. Herbert Ruckes of New York City, spent several weeks in the West collecting before the meetings. They headed for the big city immediately after the Conference.

Dr. A. D. Shaftesbury of Greensboro, N.C. traveled the greatest distance.

The vectors of plant and animal diseases proved to be a popular subject. A brief report of a week's meeting gives a very incomplete record of the many discussions that took place in the Lodge, under the trees, along the streams, during the golf games, etc.

An F.E.R.A. group has been employed during the summer in making a road from the Lodge to the Cirque. Those that have made this rather tiresome hike will soon be able to make it by auto.

The Kansas entomologists pride themselves on their horseshoe pitching and golf, but this year Dr. C. B. Philip, (going on a crutch) won the golf tournament and Dr. Herbert Ruckes from the big city of New York, where horses are found only in museums and zoos, won in horseshoes. However, Dorothy Dean did win the women's tournament in golf.

It was a pleasure to have Dr. and Mrs. Cockerell with us. This is the first meeting they have attended. They are usually on some of their collecting tours at this season of the year. They left Colorado shortly after the Conference for a Canadian trip.

Dr. C. L. Fluke spent several days before the Conference in Ft. Collins visiting old friends and working over syrphids in the Colorado collection.

It is a fine thing for both scientific and practical agriculture to have such meetings as the Conference attended by such men as M. S. Troth of Orleans, Indiana, one of the largest apple growers of the Mississippi Valley and E. R. Bliss one of Colorado's outstanding potato growers and ranchers. This is the 5th meeting that Mr. and Mrs. Bliss have attended.

It was a pleasure to again have with us Mrs. J. W. McColloch, Marjorie and Robert. The late Professor McColloch was an enthusiastic booster of the Conference and its Vice-chairman in 1930.

Geo. I. Reeves made the trip from Salt Lake City to Ft. Collins in his airplane.

Everyone had all the trout they wanted at two different meals. Some of these were caught in the Park during the meeting but a majority of them had been caught by Dr. Jones before the meetings and brought to camp in a frozen condition.

The annual contest in eating corn on the cob is usually between Geo. A. Dean and Otis Wade, but this year "Bud" Hays made their cob piles look small.

R. S. Parker and family spent their vacation in Estes Park and drove from there to Pingree Park. The Mummy Range separates these Parks by only a few miles, but it is 85 or 90 miles around by auto.

George M. List, Secretary

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